

HYDRODYNAMIC TRANSPORT AND FLOW CHANNEL PASSAGEWAYS
ASSOCIATED WITH FUEL CELL ELECTRODE STRUCTURES
AND FUEL CELL ELECTRODE STACK ASSEMBLIES

ABSTRACT OF THE DISCLOSURE

Hydrodynamic transport and flow channel passage structures associated with fuel cell electrode structures and fuel cell electrode stack assemblies, as well as to methods relating thereto, are disclosed. More specifically, the present invention is directed to a novel fluid delivery and removal channel passage structures integrally associated with electrode structures adapted for use within a fuel cell system. In one embodiment, the fluid delivery and removal channel passage structure comprises: a fluid delivery channel disposed across a first face of a silicon-based electrode structure; a fluid removal channel disposed across a second face of the silicon-based electrode structure (wherein the second face opposes the first face); and a porous bulk matrix fluid transport layer interposed between the fluid delivery channel and the fluid removal channel, wherein the porous bulk matrix fluid transport layer is adapted to hydrodynamically flow a gas or liquid therethrough, and wherein the porous bulk matrix fluid transport layer is in fluid communication with the fluid delivery and the fluid removal channels.